

ABSTRACT:

Background—Changes in high frequency QRS components of the electrocardiogram (HF QRS ECG) (150-250 Hz) are more sensitive than changes in conventional ST segments for detecting myocardial ischemia. We investigated the accuracy of 12-lead HF QRS ECG in detecting ischemia during adenosine tetrofosmin myocardial perfusion imaging (MPI).

Methods and Results—12-lead HF QRS ECG recordings were obtained from 45 patients before and during adenosine technetium-99 tetrofosmin MPI tests. Before the adenosine infusions, recordings of HF QRS were analyzed according to a morphological score that incorporated the number, type and location of reduced amplitude zones (RAZs) present in the 12 leads. During the adenosine infusions, recordings of HF QRS were analyzed according to the maximum percentage changes (in both the positive and negative directions) that occurred in root mean square (RMS) voltage amplitudes within the 12 leads. The best set of prospective HF QRS criteria had a sensitivity of 94% and a specificity of 83% for correctly identifying the MPI result. The sensitivity of simultaneous ST segment changes (18%) was significantly lower than that of any individual HF QRS criterion ($P < 0.001$).

Conclusions—Analysis of 12-lead HF QRS ECG is highly sensitive and specific for detecting ischemic perfusion defects during adenosine MPI stress tests and significantly more sensitive than analysis of conventional ST segments.

KEY WORDS: coronary, ischemia, adenosine, nuclear, electrocardiography

Condensed abstract: 12-lead high frequency QRS (HF QRS) ECGs were obtained from 45 patients before and during adenosine technetium-99 tetrofosmin myocardial perfusion imaging (MPI). A numerical score that combined baseline morphological HF QRS features with the maximum percent changes that occurred in HF QRS root mean square voltages in any four contiguous HF QRS leads during the adenosine infusion was 94% sensitive and 83% specific for correctly identifying the MPI result. 12-lead HF QRS analyses are significantly more sensitive than 12-lead ST segment analyses for identifying ischemia during adenosine MPI.